Technology Opportunity

Test and Measurement

Rocket Noise Prediction Program

The National Aeronautics and Space Administration (NASA) seeks to license its Rocket Noise Prediction Program Software for use in commercial applications. Developed at the John F. Kennedy Space Center (KSC), this innovation is a comprehensive, automated, and user-friendly software program potentially useful to next-generation commercial space launch site and launch vehicle designers and developers.

Originally developed to predict the noise environment during Space Shuttle launches, the program allows for interactive modification of various parameters affecting any generated noise environment. The software program also is adaptable to many launch environments in both government and commercial scenarios.

Potential Commercial Uses

- Acoustic modeling tool for next-generation rocket designers and manufacturers, commercial space launch site providers, and launch pad designers
- Analysis tool for acoustic loads on structures, payloads, and personnel
- Monitor for jet engine noise
- Expert tool providing accurate noise prediction and assessment valuable in litigation proceedings involving acoustic environments

Benefits

- Makes predictions for two different launch scenarios and for a variety of vehicle and launch mount configurations
- Provides predictions for both near- and far-field locations on the ground and on any position on the vehicle
- Addresses multiple engine and fuel combinations

National Aeronautics and Space Administration
John F. Kennedy Space Center, FL

The Technology

The Rocket Noise Prediction Program predicts the noise in the vicinity of a rocket during launch. It was developed to complement the vibroacoustic prediction effort for rockets now in use and to provide the capability for prediction of vibroacoustic loads associated with next-generation rockets. This type of program is needed because full-scale acoustic and vibration testing of launch vehicles and payloads is difficult, time-consuming, and expensive.

How It Works

The program implements an empirical model based partly on recognition that noise in each frequency band of interest is generated throughout the rocket-engine flow. The empirical model utilizes accumulated data from noise and structural vibration measurements performed on the Space Shuttle launch pad since 1984. Significant effort was expended to develop this new, dedicated computer code running on MATLAB®, a commercially available product recognized as a standard for technical computing. The code was verified via manual calculations to ensure programming accuracy and uses a 12-step methodology to produce a program output. The program includes the input parameters and the computed outputs. Among the computed outputs are the 1/3-octave band number, the center frequency of each band, the width of the frequency band, and the sound-pressure level in that band. A plot of sound-pressure level for each 1/3-octave band number is also generated for use in developing specifications for qualification tests.

Options for Commercialization

NASA seeks qualified companies to commercialize the Rocket Noise Prediction Program. This and other technologies are made available by the KSC Technology Commercialization Office through a variety of licensing and partnering agreements. These include patent and copyright licenses, cooperative agreements, and reimbursable and nonreimbursable Space Act Agreements.

Contact

If your company is interested in the Rocket Noise Prediction Program or if you desire additional information, please reference Case Number KSC-12061 and contact:

Lynne Henkiel
SERTTC Industry Liaison
Technology Commercialization Office
Mail Code: YA-C1
Kennedy Space Center, FL 32899
Telephone: (321) 867-8130
Fax: (321) 867-2050
Lynne.Henkiel-1@ksc.nasa.gov

Commercialization Checklist

- [ ] Patent pending
- [ ] U.S. Patent
- [x] Copyrighted
- [x] Available for licensing
- [ ] Available for no-cost transfer
- [ ] Seeking industry partner for further codevelopment

KSC-12061/TOP10-68/01-03/2.3